

NON-PUBLIC?: N
ACCESSION #: 9009100252

LICENSEE EVENT REPORT (LER)

FACILITY NAME: NORTH ANNA POWER STATION, UNIT 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000338

TITLE: REACTOR TRIP RESULTING FROM EHC SYSTEM TRANSIENT
EVENT DATE: 12/05/89 LER #: 89-017-00 REPORT DATE: 12/28/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 007

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: G. E. Kane, Station Manager TELEPHONE: (703) 894-2101

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 2236 hours on December 5, 1989, Unit 1 experienced an automatic reactor trip from approximately 7 percent power. The reactor trip occurred due to a Low Low level in the "B" Steam Generator (S/G). This event is reportable pursuant to 10CFR50.73(a)(2)(iv).

Prior to the reactor trip, reactor power was being reduced due to Electro Hydraulic Control (EHC) system pressure transients. Approximately 16 minutes before the reactor trip, the main generator output breaker was opened and the turbine was manually removed from service.

The EHC system pressure transient was caused by leaking turbine overspeed protection circuitry (OPC) valves. The OPC valves were replaced and other EHC system modifications/replacements were implemented. An event investigation is being performed to determine

additional EHC system upgrades. Unit 1 was placed on line at 0434 hours on December 21, 1989.

This event posed no significant safety implications because safety related equipment functioned as expected and key reactor parameters stabilized following the reactor trip. The health and safety of the general public were not affected.

END OF ABSTRACT

TEXT PAGE 2 OF 04

1.0 Description of the Event

At 2236 hours on December 5, 1989, Unit 1 experienced an automatic reactor trip from approximately 7 percent power. The reactor trip occurred due to a Low Low level in the "B" Steam Generator (S/G) (EIS System Identifier AB, Component Identifier SG). This event is reportable pursuant to 10CFR50.73(a)(2)(iv).

Prior to the reactor trip, reactor power was being reduced due to a series of Electro Hydraulic Control (EHC) system pressure (EIS System Identifier TG) transients. During these power reductions the turbine governor moog valves (EIS System Identifier TA, Component Identifier V) and strainers (EIS Component Identifier STR) were replaced. At 1814 hours on December 5, 1989, a reduction in EHC system pressure resulted in an approximate 100 Mw loss of load. As a corrective action, the number 1 and number 4 governor valves were isolated. The number 3 governor valve was placed in test to maintain it in the desired position, and the Unit was taken to approximately 30 percent power. The turbine governor valve EHC control during this period was erratic. At 2215 hours, a pressure transient in the EHC system occurred, causing the number 3 governor valve to go closed from 28 percent open. The number 2 governor valve was at 8 percent and did not respond in accordance with the Turbine Control Program. The operators stabilized the Unit at 7 percent power and approximately 30 MWe and the generator was subsequently removed from service. At 2220 hours, the operator manually removed the turbine from service. Steam generator (S/G) levels could not be maintained constant (due to swell caused by the Steam Dumps coming open), resulting in a high high level in the 'C' S/G and a subsequent trip of the main feedwater pump. Although Auxiliary Feedwater (EIS System Identifier BA) automatically initiated and Main Feedwater (EIS System Identifier SJ) was restored, the 'B' S/G level slowly decreased to the low low setpoint which generated the reactor trip signal.

After event investigation and corrective action, Unit 1 was placed on line at 0434 hours on December 21, 1989.

TEXT PAGE 3 OF 04

2.0 Significant Safety Consequences and Implications

This event posed no significant safety implications because safety related equipment functioned as designed with the exception of Source Range Nuclear Instrumentation, N-31 and N-32, (EHS System Identifier IG, Component Identifier DET) which were identified as inoperable prior to the event. The Gammametrics narrow and wide range Nuclear Instrumentation, which provides backup source range neutron flux indication, remained fully operable during this event and the shutdown margin was verified to be greater than or equal to 1.77 percent delta k over k within one hour as required by the Technical Specifications.

3.0 Cause of the Event

The reactor trip occurred due to a Low Low level in the "B" Steam Generator (S/G). The Low Low level was caused by a feedwater isolation due to a Hi Hi level in the "C" S/G which subsequently tripped the running main feedwater pump. Although Auxiliary Feedwater (EHS System Identifier BA) automatically initiated and Main Feedwater (EHS System Identifier SJ) was restored, the 'B' S/G level slowly decreased to the low low setpoint which generated the reactor trip signal.

The EHC system pressure transient was primarily a result of leaking turbine overspeed protection circuitry (OPC) valves (EHS System Identifier JJ, Component Identifier V). The OPC valves will be sent to the manufacturer to identify the specific cause of the leak.

4.0 Immediate Corrective Action

As an immediate corrective action, Emergency Procedure EP-0, "Reactor Trip or Safety Injection", was entered and the plant was stabilized in Mode 3.

TEXT PAGE 4 OF 04

5.0 Additional Corrective Action

The OPC valves were replaced. The following EHC system modifications and replacements were also implemented to enhance the reliability of the EHC system:

1. Both EHC pumps were replaced with higher capacity pumps.
2. The EHC reservoir was drained and cleaned.
3. The EHC fluid and filters were changed.
4. The EHC suction strainer was replaced.
5. The four turbine throttle valve MOOG valves were replaced
6. The number 1 Governor Valve Actuator was replaced.
7. The diaphragm seals were replaced on the "C" EHC high pressure accumulator.
8. Extensive functional testing of the EHC system was performed by station engineering and the Westinghouse Technical representative.

An event investigation is being performed to determine additional EHC system upgrades. Recommendations resulting from the event investigation will be evaluated and implemented as necessary.

The detector for Source Range Nuclear Instrumentation channel N-31 was replaced, the crowbar circuit for channel N-32 was reset, and both channels were returned to service following satisfactory completion of functional testing.

6.0 Actions to Prevent Recurrence

Recommendations resulting from the event investigation will be evaluated and implemented as necessary.

7.0 Similar Events

Reactor trips due to EHC system malfunctions have occurred on Unit 1 on July 19, 1989 (LER N1-89-014-00) and March 19, 1988 (LER N1-88-013-00).

ATTACHMENT 1 TO 9009100252 PAGE 1 OF 2

December 28, 1989

10 CFR 50.73

U. S. Nuclear Regulatory Commission Serial No. N-89-024
Attention: Document Control Desk NO/DEQ: nih
Washington, D.C. 20555 Docket No. 50-338

License No. NPF-4

Dear Sirs:

The Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Unit 1.

Report No. LER 89-017-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to Safety Evaluation and Control for their review.

Very truly yours,

Original Signed By
G. E. Kane

G. E. Kane
Station Manager

Enclosure:

cc: U. S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Suite 2900
Atlanta, Georgia 30323

Mr. J. L. Caldwell
NRC Senior Resident Inspector
North Anna Power Station

ATTACHMENT 1 TO 9009100252 PAGE 2 OF 2

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